

DENON

Hi-Fi Stereo Power Amplifier

SERVICE MANUAL MODEL POA-1500

STEREO POWER AMPLIFIER



CONTENTS

SPECIFICATIONS	1
DESCRIPTION OF PARTS AND THEIR FUNCTION	2
CONNECTIONS	3
TROUBLE SHOOTING	4
METHOD OF ADJUSTMENT	5,6
SEMICONDUCTORS	6
PRINTED WIRING BOARD PATTERNS AND PARTS LIST	
CONTROL & P.S. UNIT (ETC0627D/C/B)	7,8
POWER AMP & POWER SOURCE UNIT (PUS0021L)	9,10
CONNECTION DIAGRAM	11
WIRING DIAGRAM	12
EXPLODED VIEW	13

NIPPON COLUMBIA CO., LTD.

SPECIFICATIONS

POWER AMPLIFIER

Rated Output Power: (when both channel are used)

20 Hz to 20 kHz 150 W + 150 W (Speaker impedance 8 ohm)
 20 Hz to 20 kHz (Speaker impedance 4 ohm) U.S.A. and MULTI
 1 kHz 150 W + 150 W (IEC) (Subject to change by temperature test)
 150 Watts per channel minimum RMS, both channel driven at 8 ohm from
 20 Hz ~ 20 kHz no more than 0.005% total harmonic distortion. (U.S.A.)

Total Higher Harmonic Distortion: 0.002% (at the rated output provided/-3 dB) speaker impedance assumed to be 8 ohm

Cross Modulation Distortion: 7 kHz/60 Hz: 1/4, less than 0.0015% (at the time of operation with the power amplification equivalent to the rated output)
 speaker impedance assumed to be 8 ohm

Output Frequency Bandwidth: 5 Hz ~ 80 kHz (IHF)
 (IHF, T.H.D 0.015%), speaker impedance assumed to be 8 ohm

Transmission Characteristic: 1 Hz ~ 300 kHz +0 dB (at an output of 1 W)
 -3 dB

Input Level: 1 V (NORMAL)

1.41 V (HIGH CUT FILTER IN)

Input Impedance: 18 k ohm (NORMAL IN)

25 k ohm (HIGH CUT FILTER IN)

Output Impedance: 0.1 ohm (1 kHz)

SN Ratio (IHF "A"): 123 dB

Hi Cut Filter: 40 kHz 6 dB/oct (FILTER IN)

Subsonic Filter: 16 Hz 6 dB/oct

Slew Rate: ±400 V/μsec

PEAK LEVEL METER OPERATION CHARACTERISTIC

Type of Indication: Peak output level indication

Range of Indication: -50 dB ~ +5 dB

0 dB = 200 W/8 ohm

Frequency Response: 10 Hz ~ 100 kHz ±3 dB impedance assumed to be 8 ohm

OUTPUT TERMINALS

SPEAKERS: A or B Load 8 ~ 16 ohm (IEC)

A + B Load 16 ohm (IEC)

SPEAKERS: A or B Load 4 ohm to 16 ohm, U.S.A. and MULTI

A + B Load 8 ~ 16 ohm

SELF-DIAGNOSTIC FUNCTION

Abnormal temperature detection and problem indication

Left-channel and right-channel abnormal output level check and indication

OTHERS

Power Source: AC 120 V, 60 Hz

or AC 110/120/220/240 V, 50 Hz

or AC 220 V, 50 Hz

or AC 240 V, 50 Hz

Power Consumption: 300 W (IEC)

380 W (U.S.A. and MULTI)

Dimensions: 470 x 168 x 418 (including control knobs, and stand)

Weight: 20 kg

* POA-1500 design and specifications are subject to change without notice.

NOTE: The following codes correspond to the appropriate models.

E3 for U.S.A., EC for Canada, E2 for Europe, and E1 for Hong Kong, Singapore.

This Service Manual is prepared based on E3.

DESCRIPTION OF PARTS AND THEIR FUNCTION

FRONT PANEL VIEW

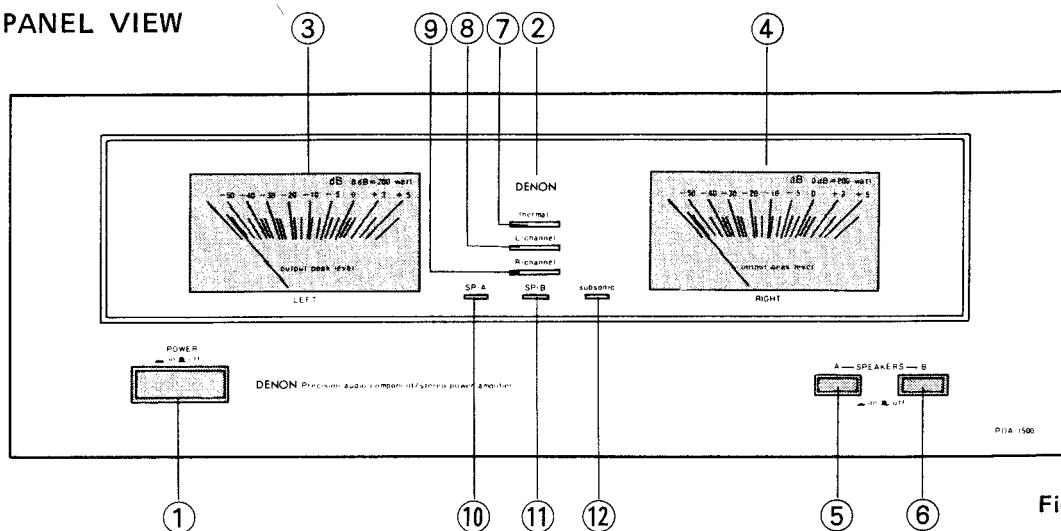


Fig. 1

① POWER (power switch)	⑦ ⑧ ⑨ SELF-DIAGNOSIS (self-diagnostic result indicators lamps)
② POWER SOURCE INDICATOR (power supply pilot lamp)	⑦ Thermal protector lamp
③ ④ OUTPUT PEAK LEVEL (peak output meter)	⑧ Left-channel output level indicator lamp
⑤ ⑥ SPEAKERS (speaker selector switches) ● SPEAKERS-A, ● SPEAKERS-B	⑨ Right-channel output level indicator lamp
	⑩ ⑪ SPEAKERS-A-B INDICATOR LAMPS
	⑫ SUBSONIC ON INDICATOR LAMP

BACK PANEL VIEW

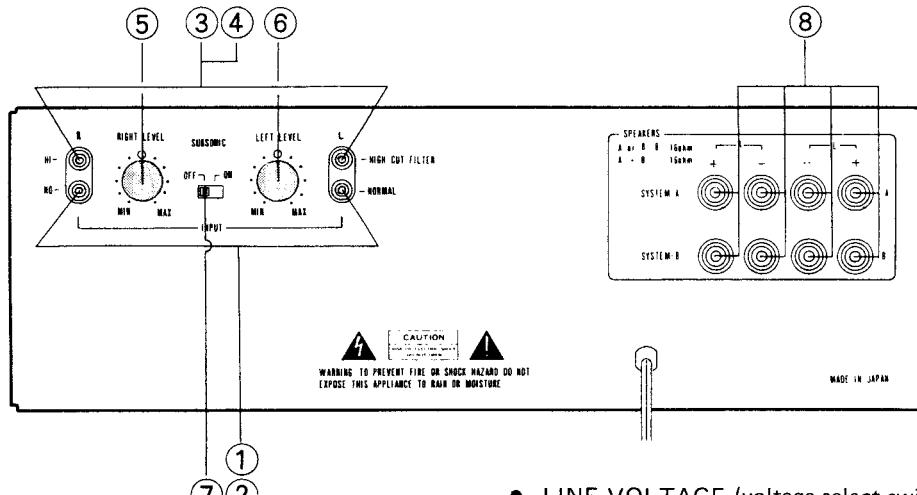


Fig. 2

① ② INPUTS (normal)	● LINE VOLTAGE (voltage select switch) (NOT INCLUDED IN SYSTEMS FOR EUROPE OR CANADA, U.S.A. USE)
① INPUT for the right-channel	* It is possible to change the voltage by turning the VOLTAGE SELECTOR on the back panel using a screw driver.
② INPUT for the left-channel	* Do not twist the VOLTAGE SELECTOR with abnormal force.
③ ④ INPUTS (for the high-frequency cutoff filters)	* If the voltage switch is not easy, contact your local DENON dealer.
③ INPUT for the right-channel	
④ INPUT for the left-channel	
⑤ RIGHT LEVEL (right-channel input level control)	
⑥ LEFT LEVEL (left-channel input level control)	
⑦ SUBSONIC (subsonic-filter switch)	
⑧ SPEAKER (speaker connecting terminals)	

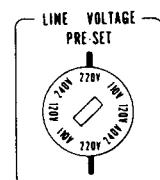


Fig. 3

CONNECTIONS

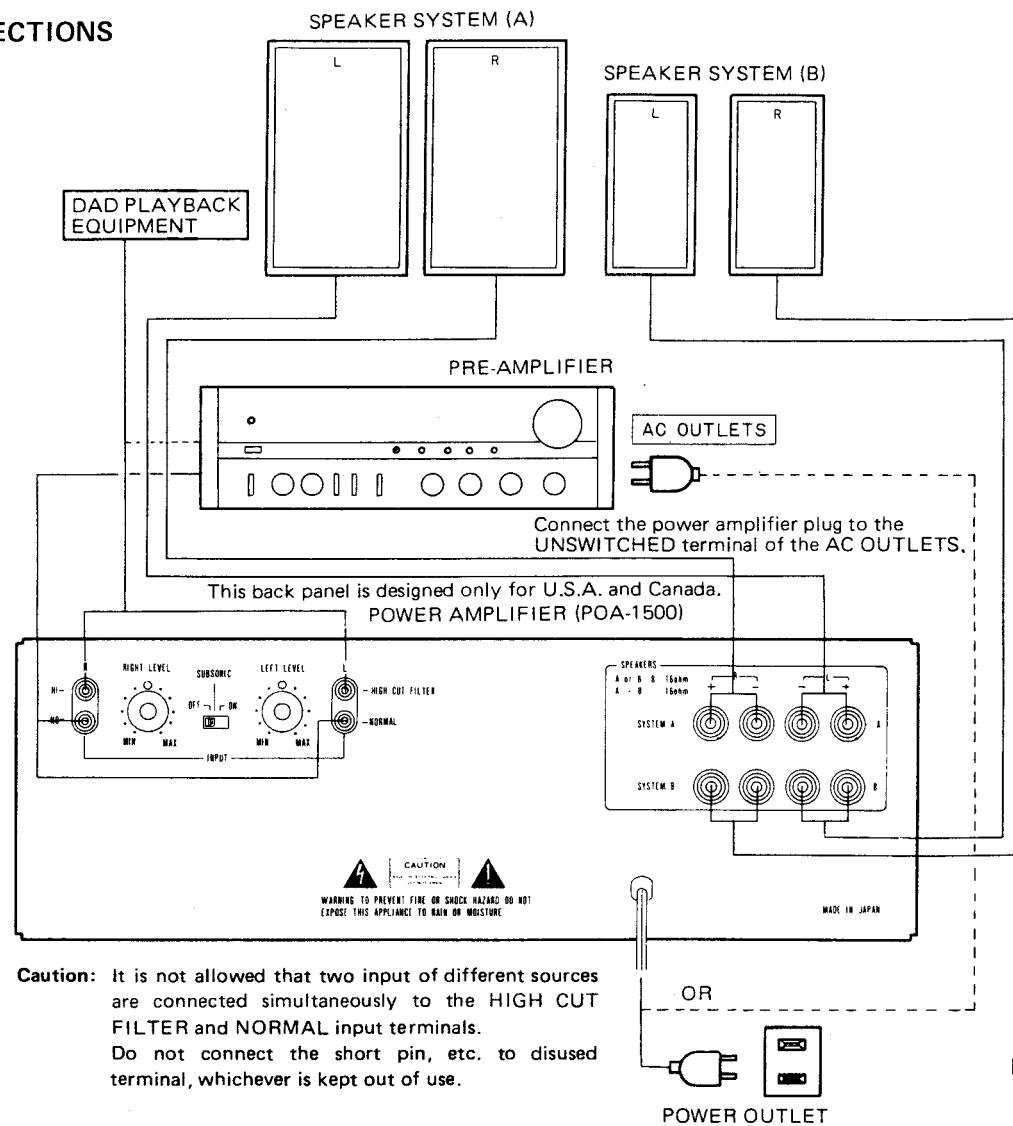


Fig. 4

PRECAUTIONS ON CONNECTION

- Do not insert the power cord into the socket before all the connections are completed.
- After confirming the right and left channels, connect L with L and R with R.
- Firmly insert the plug. An imperfect connection may cause noise.
- If a pin plug and power cord are bundled together or if a pin cord is placed near a power transformer, hum or noise may result.

BLOCK DIAGRAM

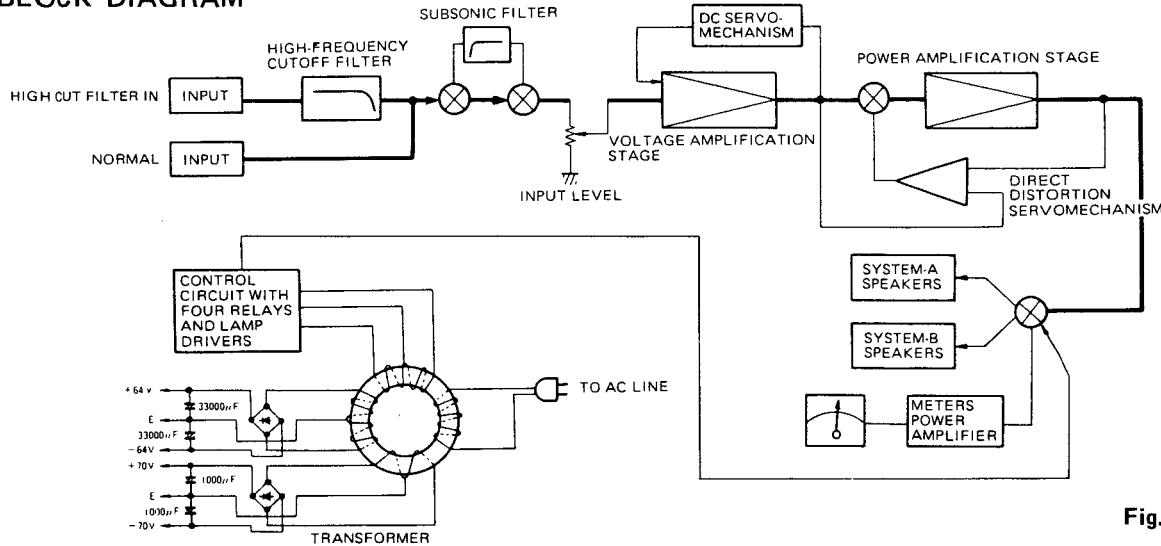


Fig. 5

TROUBLE SHOOTING

Before troubleshooting, be sure your audio system is really in trouble or not.

1. Check all connections for correctness.
2. See that your audio system is being operated according to the instruction manual.
3. Check that the speakers and pre-amplifier are working properly.

In case the POA-1500 fails to provide normal performance, check it referring to the following troubleshooting chart.

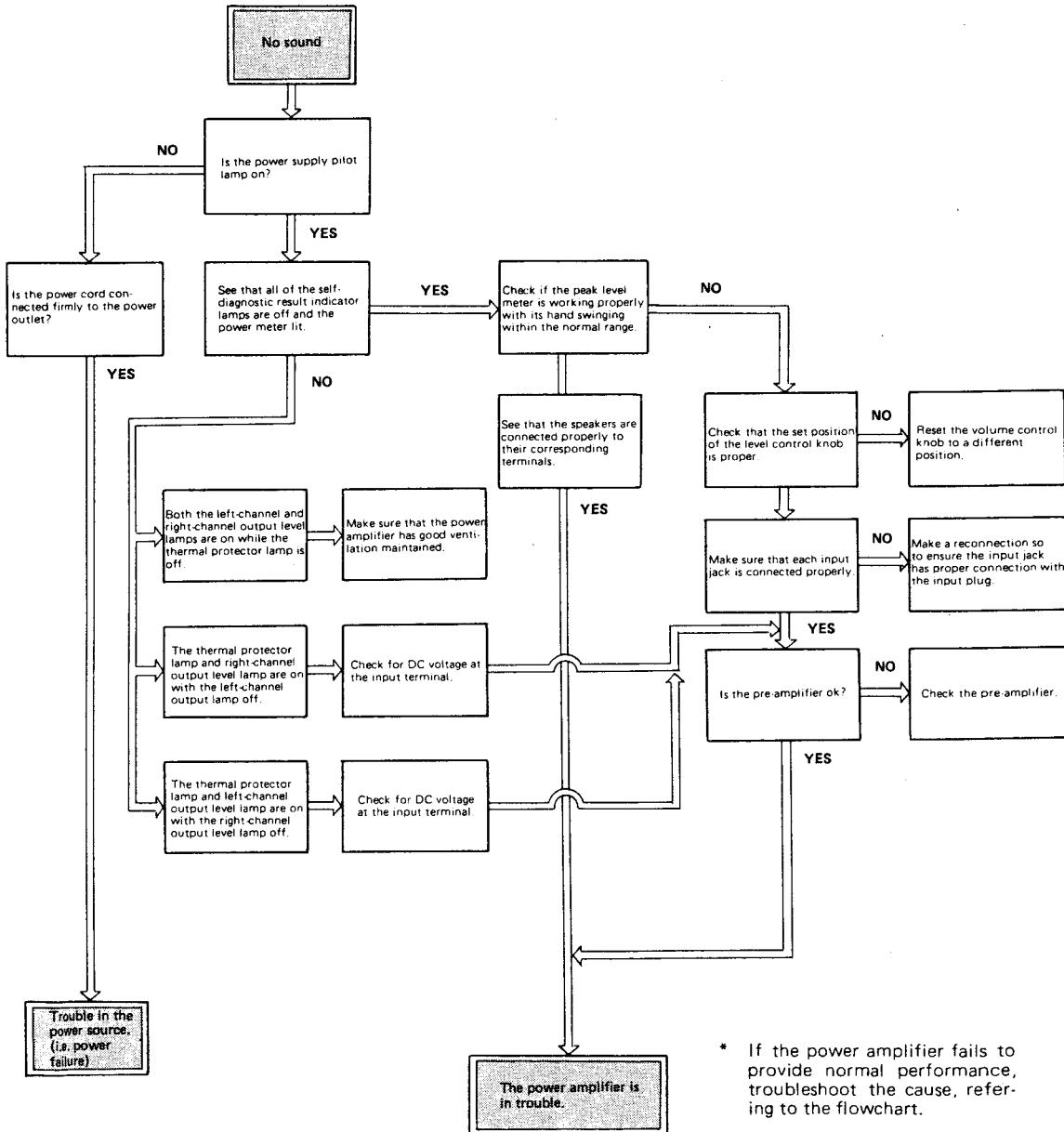


Fig. 6

METHOD OF ADJUSTMENT

IDLING CURRENT

- 1 Connect digital voltmeter to TP1 (Rch) terminal of PUS0021L-1 and TP2 (Lch) terminal of PUS0021L-2.
- 2 Turn power "on", after 2 to 3 minutes warming up, adjust VR1 (Rch) and VR2 (Lch) so that the digital voltmeter indicates $15 \pm 1\text{mV}$.

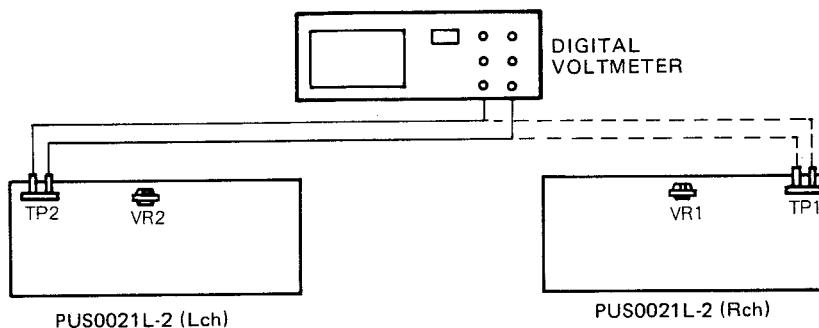


Fig. 7

NEUTRAL POINT

- 1 Connect digital voltmeter to speaker terminals "A".
- 2 Turn power switch "on".
- 3 Set main volume control on rear panel to MAX.
- 4 See to it that the digital voltmeter indicates less than 100mV.

METER ADJUSTMENT

- 1 Connect oscillator to input terminals "NORMAL".
- 2 Connect V.T.V.M. to speaker terminals "A".
- 3 Turn power switch "on" and set main volume control to MAX.
- 4 Set the oscillator frequency to 1 kHz, and adjust the oscillator output level so that the speaker output level to 40 V.
- 5 Adjust VR3 (L ch), VR4 (Rch) on ETC027-1 so that the meter indicates 0 dB.
- 6 Set ATT. to -10 dB , and check meter indicates $-10\text{ dB} \pm 1.5\text{ dB}$.
- 7 Set ATT. to -20 dB , and check meter indicates $-20\text{ dB} \pm 2\text{ dB}$.

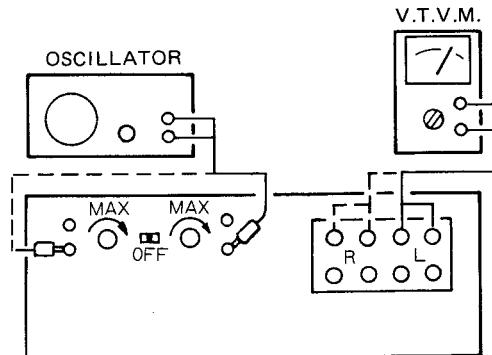


Fig. 8

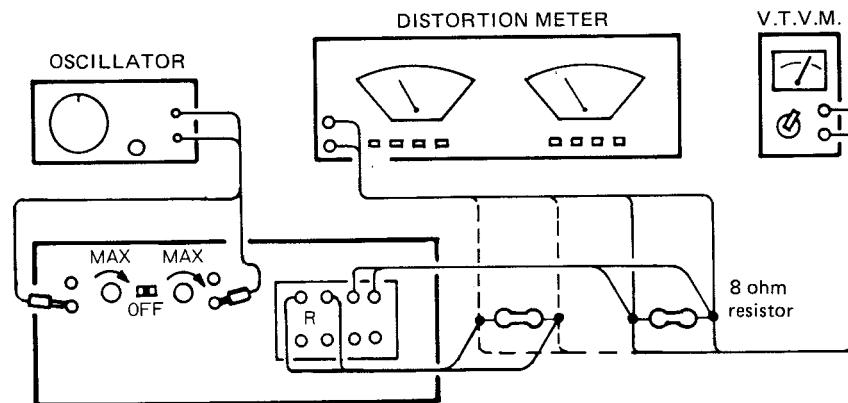
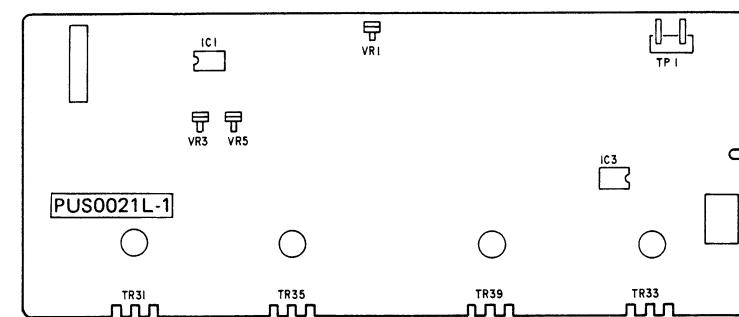
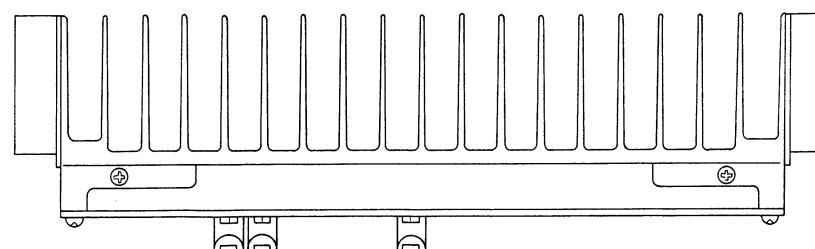


Fig. 9

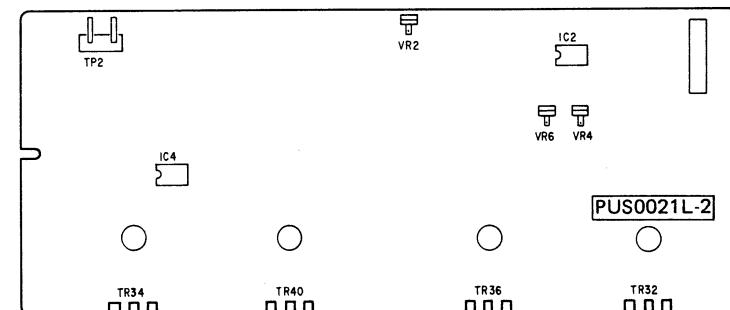
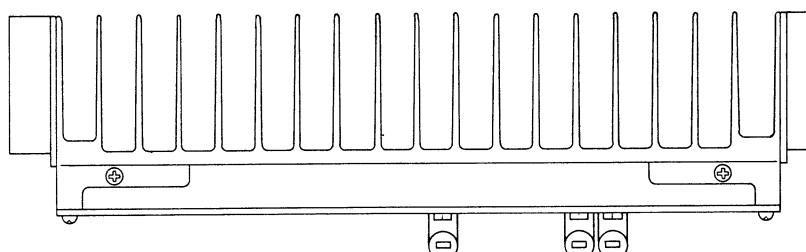
DISTORTION

- 1 Connect oscillator to input terminals "NORMAL". (at the same time input L and R ch)
- 2 Connect 8 ohm dummy load to speaker terminals "A" and apply distortion meter with V.T.V.M.
- 3 Turn power switch "on".
- 4 Set main volume control to MAX.
- 5 Set the oscillator frequency to 1 kHz, and adjust oscillator output level so that the speaker output level 24.5V/75W.
- 6 Adjust VR3 (Rch) and VR4 (Lch) for minimum distortion.
- 7 Set the oscillator output level to 20 kHz, and adjust oscillator output level so that the speaker output level 24.5V/75W.
- 8 Adjust VR5 (Rch) and VR6 (Lch) for minimum distortion.

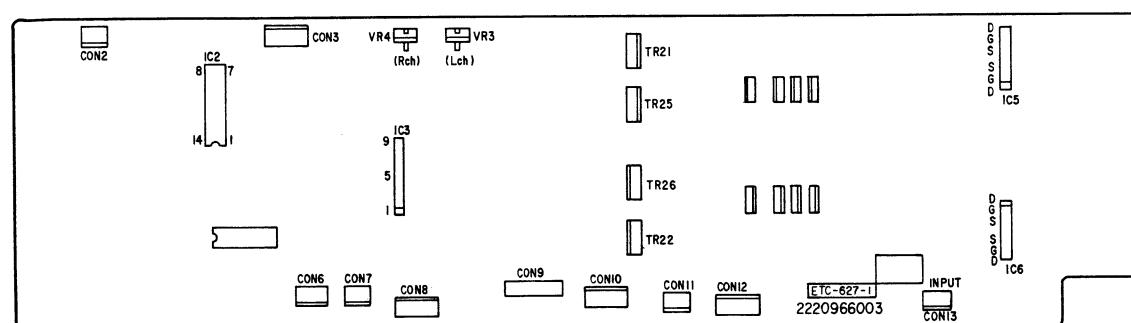
PUS0021L-1 P.A & P.S UNIT For Rch.



PUS0021L-2 P.A & P.S UNIT For Lch.

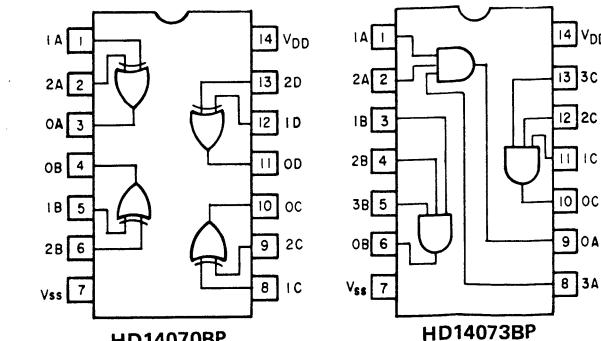
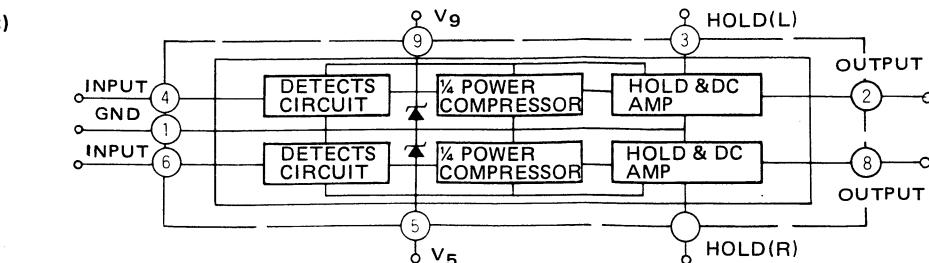
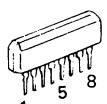
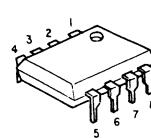
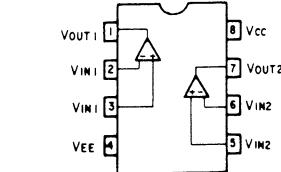
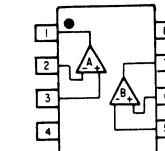


ETC0627D CONTROL UNIT

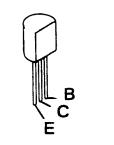
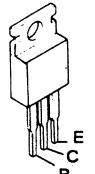
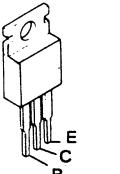
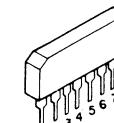
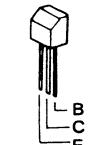


SEMICONDUCTORS

• IC

HD14070BP
HD14073BPTA7318P (B/C)
(Toshiba)NJM082D
(JRC)LA6458DS
(Sanyo)

• TRANSISTORS (include FET)

2SC1815(BL)(Y)
2SC1841(F)/(E)
2SA1015(Y)2SC2238(Y)
2SA968(Y)
2SC2238(Y)2SA1294LB(O)/(Y)
2SC3263LB(O)/(Y)FET
2SK270A(BL)/(V)2SC1941(L)
2SA916(L)

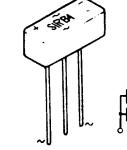
• DIODES (include LED, Thermistor)

HZ7B-3
HZ-15-2
BLACK *MZ-303A
MZ-304B
DARK BLUE *1S2076(A)
DARK BLUE
SKY BLUE
(A)KB-265
RED
BLACKKB-462
ORANGE
BLACK *

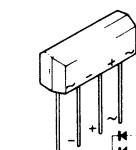
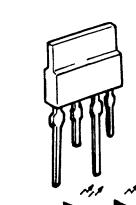
ID2C-1



STV-1H



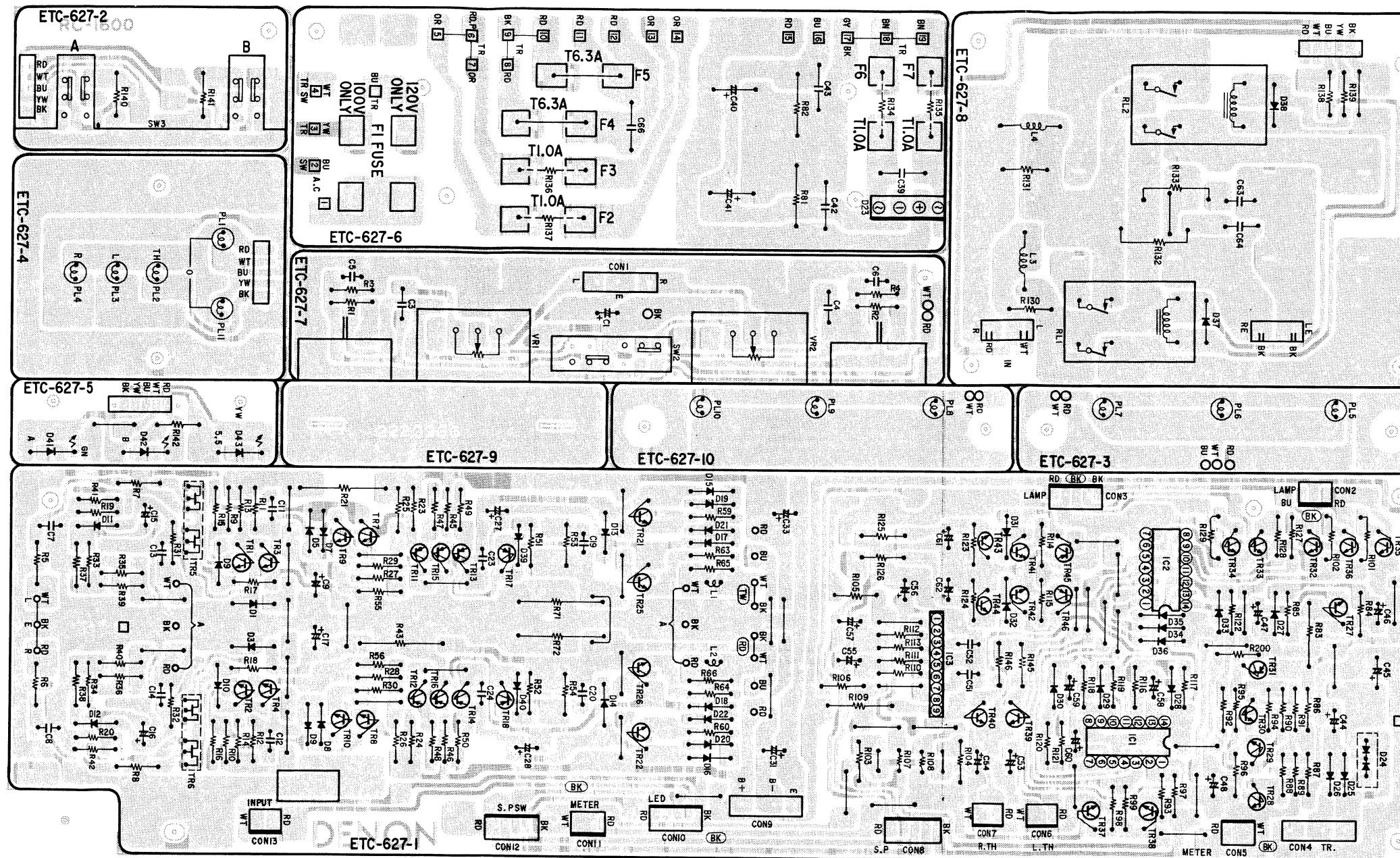
UB-152

SLP271E(Green)
SLP471E(Yellow)

PRINTED WIRING BOARD PATTERNS AND PARTS LIST

ETC0627D CONTROL & P.S UNIT

NOTE: The pattern ETC-627-6 is for E3 model. E2 model is omitted resistors F2, F3, F6, F7 and jumpers F4, F5, and added fuses to F1 through F7 and label.



ETC0627B CONTROL & P.S UNIT (For E2)

Except those listed below all other parts are same as ETC0627D.

Ref. No.	Part No.	Parts Name & Descriptions		Remarks
RESISTORS				
R134 ~137	2440005029	1 ohm	±5% 1W Metal Oxide (NB)	Delete
CAPACITORS				
C063, 064	2554177005	0.022μF	±5% Plastic Film	Change
OTHER PARTS				
F002, 003, 006, 007	2090008120 2020022008 4150187002 2061015090 2061015029	0.6 Jumper Wire Fuse Holder Fuse Cover Fuse (5 A) Fuse (1 AT)	Used 48 Used 14 (SEMCO) Used 2	Change Change Delete Change Add

ETC0627C CONTROL & P.S UNIT (For E1)

Except those listed below all other parts are same as ETC0627D.

Ref. No.	Part No.	Part Name & Descriptions		Remarks
OTHER PARTS				
	2090003120	0.6 Jumper Wire	Used 48	Change

ETC0627D CONTROL & P.S UNIT PARTS LIST

Ref. No.	Part No.	Part Name & Descriptions
SEMICONDUCTORS		
IC001	2620461001	HD14070BP(HITACHI) IC
IC002	2620306001	HD14073BP(HITACHI) IC
IC003	2630071009	TA7318P(TOSHIBA) IC
TR001 ~004	2730198015	2SC1815(BL) TRANSISTOR
TR005	2750036034	2SK270A(GR/BL/V) FET
TR006	2750036034	2SK270A(GR/BL/V) FET
TR007 ~010	2730235020	2SC1841(E/F) TRANSISTOR
TR011 ~016	2710110000	2SA916(L) TRANSISTOR
TR017	2730205005	2SC1941(L) TRANSISTOR
TR018	2730205005	2SC1941(L) TRANSISTOR
TR021	2730259006	2SC2238B(Y) TRANSISTOR
TR022	2730259006	2SC2238B(Y) TRANSISTOR
TR025	2710151001	2SA968B(Y) TRANSISTOR
TR026	2710151001	2SA968B(Y) TRANSISTOR
TR027	2730198002	2SC1815(Y) TRANSISTOR
TR028 ~030	2730198015	2SC1815(BL) TRANSISTOR
TR031	2710102005	2SA1015(Y) TRANSISTOR
TR032 ~044	2730198015	2SC1815(BL) TRANSISTOR
TR045	2710102005	2SA1015(Y) TRANSISTOR
TR046	2710102005	2SA1015(Y) TRANSISTOR
D001	2760253001	HZ15-2 ZENER
D003	2760253001	HZ15-2 ZENER
D005 ~008	2760049008	1S2076 DIODE
D009	2760244007	MZ303A ZENER
D010	2760244007	MZ303A ZENER
D011	2760049008	1S2076 DIODE
D012	2760049008	1S2076 DIODE
D013	2760216019	KB-265 DIODE
D014	2760216019	KB-265 DIODE
D015 ~018	2760049008	1S2076 DIODE
D019	2760210015	MZ304B ZENER
D022	2760333002	UB-152 DIODE
D023	2760151006	1D2C-1 DIODE
D025	2760049011	1S2076A DIODE
D026	2760049011	1S2076A DIODE
D027	2760254000	HZ7-3 ZENER
D028 ~040	2760049008	1S2076 DIODE
D041	3939155023	SLP-271E(GREEN) LED
D042	3939155023	SLP-271E(GREEN) LED
D043	3939155036	SLP-471E(YELLOW) LED
RESISTORS (not included Carbon Film ±5%, 1/4W Type)		
VR001	2110228107	VARIABLE RESISTOR 100 kohm R LEVEL
VR002	2110228107	VARIABLE RESISTOR 100 kohm L LEVEL
VR003	2116014043	SEMI FIXED RESISTOR 500 ohm
VR004	2116014043	SEMI FIXED RESISTOR 500 ohm
R009 ~012	2412316092	3.3 kohm ±2% 1/4W CARBON FILM (FR)
R021	2440105026	3.9 kohm ±5% 2W METAL OXIDE (NB)
R023 ~026	2412321003	1 kohm ±5% 1/4W CARBON FILM (NB)
R043	2440105026	3.9 kohm ±5% 2W METAL OXIDE (NB)
R045	2412314023	470 ohm ±5% 1/4W CARBON FILM (NB)

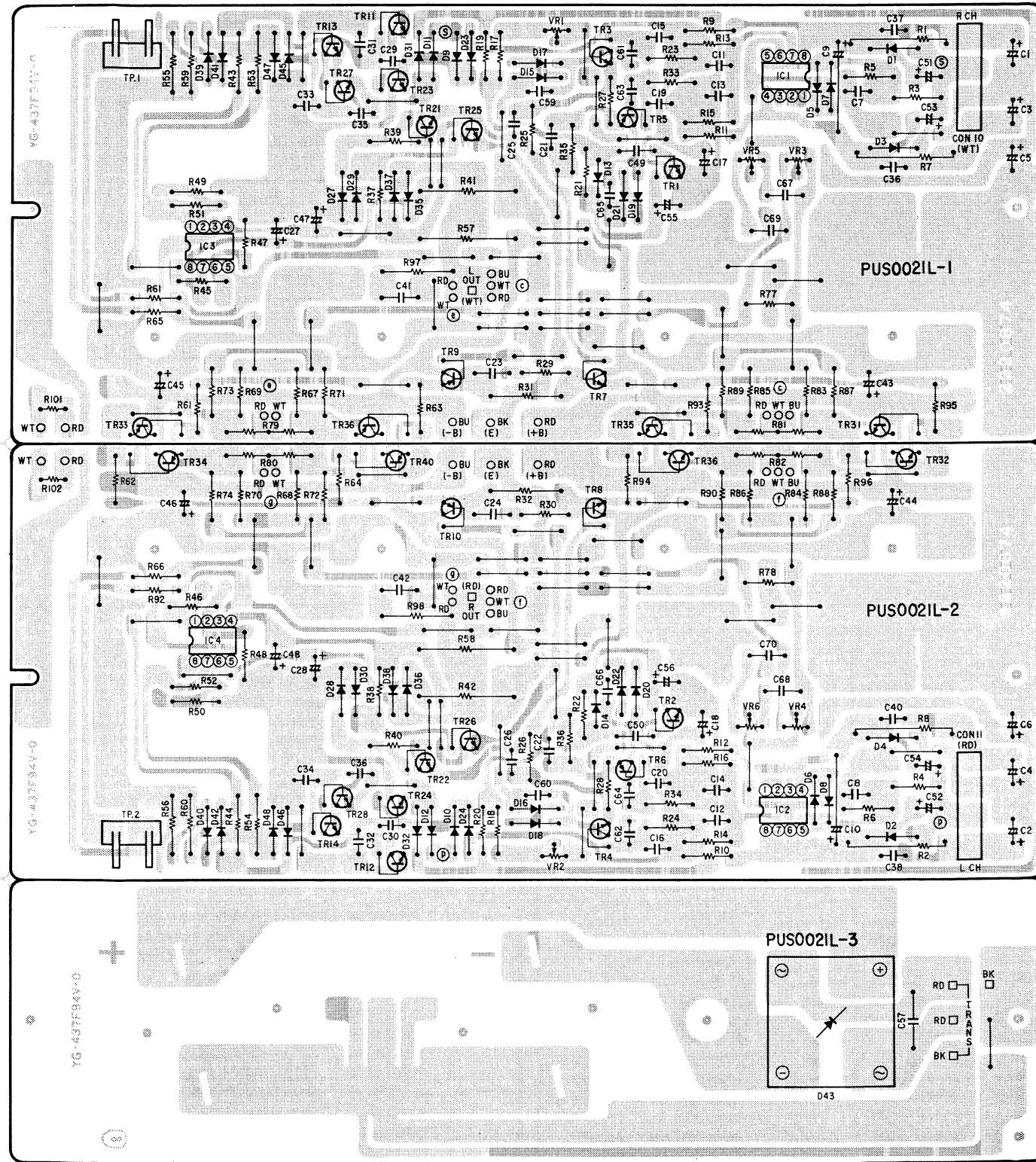
Ref. No.	Part No.	Part Name & Descriptions		
R046	2412314023	470 ohm	$\pm 5\% \frac{1}{2}W$	CARBON FILM (NB)
R047	2412321016	22 ohm	$\pm 5\% \frac{1}{2}W$	CARBON FILM (NB)
~050				
R051	2412321003	1 kohm	$\pm 5\% \frac{1}{2}W$	CARBON FILM (NB)
~054				
R055	2412314036	750 ohm	$\pm 5\% \frac{1}{2}W$	CARBON FILM (NB)
R056	2412314036	750 ohm	$\pm 5\% \frac{1}{2}W$	CARBON FILM (NB)
R059	2412321016	22 ohm	$\pm 5\% \frac{1}{2}W$	CARBON FILM (NB)
R060	2412321016	22 ohm	$\pm 5\% \frac{1}{2}W$	CARBON FILM (NB)
R063	2412321016	22 ohm	$\pm 5\% \frac{1}{2}W$	CARBON FILM (NB)
R064	2412321016	22 ohm	$\pm 5\% \frac{1}{2}W$	CARBON FILM (NB)
R083	2440041025	1 kohm	$\pm 5\% 1W$	METAL OXIDE (NB)
R109	2440039024	680 ohm	$\pm 5\% 1W$	METAL OXIDE (NB)
R132	2440021029	22 ohm	$\pm 5\% 1W$	METAL OXIDE (NB)
R133	2440021029	22 ohm	$\pm 5\% 1W$	METAL OXIDE (NB)
R134	2440005029	1 ohm	$\pm 5\% 1W$	METAL OXIDE (NB)
~137				
R140	2410187003	1.2 kohm	$\pm 5\% \frac{1}{2}W$	CARBON FILM
~142				

CAPACITORS (not included Ceramic $\pm 5\%$, 50V Type)

C001	2544146004	1 μ F	50V ELECTROLYTIC	
C003	2544145005	0.47 μ F	50V ELECTROLYTIC	
C004	2544145005	0.47 μ F	50V ELECTROLYTIC	
C005	2554131009	270pF	$\pm 5\% 50V$ PLASTIC FILM	
~008				
C009	2544138009	47 μ F	25V ELECTROLYTIC	
C011	2554163006	0.0056 μ F	$\pm 5\% 50V$ PLASTIC FILM	
C012	2554163006	0.0056 μ F	$\pm 5\% 50V$ PLASTIC FILM	
C013	2521003005	3pF	$\pm 0.25pF 50V$ MICA	
C014	2521003005	3pF	$\pm 0.25pF 50V$ MICA	
C015	2543016083	22 μ F	$\pm 20\% 50V$ ELECTROLYTIC (B.P)	
C016	2543016083	22 μ F	$\pm 20\% 50V$ ELECTROLYTIC (B.P)	
C017	2544138009	47 μ F	25V ELECTROLYTIC	
C019	2554145008	0.001 μ F	$\pm 5\% 50V$ PLASTIC FILM	
C020	2554145008	0.001 μ F	$\pm 5\% 50V$ PLASTIC FILM	
C023	2521081027	3pF	$\pm 0.5pF 500V$ MICA	
C024	2521081027	3pF	$\pm 0.5pF 500V$ MICA	
C027	2544181014	10 μ F	$\pm 20\% 100V$ ELECTROLYTIC	
C028	2544181014	10 μ F	$\pm 20\% 100V$ ELECTROLYTIC	
C031	2544181014	10 μ F	$\pm 20\% 100V$ ELECTROLYTIC	
C033	2544181014	10 μ F	$\pm 20\% 100V$ ELECTROLYTIC	
C039	2561017019	0.01 μ F	$\pm 10\% 630V$ METALIZED	
C040	2546070000	1000 μ F	$\pm 20\% 80V$ ELECTROLYTIC	
C041	2546070000	1000 μ F	$\pm 20\% 80V$ ELECTROLYTIC	
C042	2561016007	0.068 μ F	$\pm 10\% 400V$ METALIZED	
C043	2561016007	0.068 μ F	$\pm 10\% 400V$ METALIZED	
C044	2544060038	0.47 μ F	100V ELECTROLYTIC	
C045	2544159017	1000 μ F	35V ELECTROLYTIC	
C046	2544146004	1 μ F	50V ELECTROLYTIC	
C047	2544146004	1 μ F	50V ELECTROLYTIC	
C048	2544140000	4.7 μ F	35V ELECTROLYTIC	
C051	2551212025	0.01 μ F	$\pm 5\% 50V$ PLASTIC FILM	
C052	2551212025	0.01 μ F	$\pm 5\% 50V$ PLASTIC FILM	
C053	2544146004	1 μ F	50V ELECTROLYTIC	
~055				

Ref. No.	Part No.	Part Name & Descriptions	
C056	2544145005	0.47 μ F	50V ELECTROLYTIC
C057	2544146004	1 μ F	50V ELECTROLYTIC
~060			
C061	2544130007	100 μ F	10V ELECTROLYTIC
C062	2544130007	100 μ F	10V ELECTROLYTIC
C063	2561017035	0.022 μ F	$\pm 10\% 630V$ METALIZED
C064	2561017035	0.022 μ F	$\pm 10\% 630V$ METALIZED
C066	2561017019	0.01 μ F	$\pm 10\% 630V$ METALIZED
COILS			
L001	2350008006	INDUCTOR 22 μ H	
L002	2350008006	INDUCTOR 22 μ H	
L003	2350007007	INDUCTOR 1 μ H	
L004	2350007007	INDUCTOR 1 μ H	
SWITCHES			
SW002	2124311107	SLIDE SWITCH	
SW003	2124449008	2P PUSH SWITCH	
PILOT LAMPS			
PL001	3930083013	PILOT LAMP 28V 0.04A USED 10	
OTHER PARTS			
F001	2220966100	P.W. BOARD	
	2090008120	0.6 JUMPER WIRE USED 50	
	2050134908	TERMINAL PIN USED 25	
	2090008146	JUMPER P=5mm USED 4	
	2090008104	JUMPER P=15mm USED 2	
	2020022008	FUSE HOLDER USED 2	
	4150187002	FUSE COVER USED 2	
	2061035096	FUSE 10.0A	
	2061044003	FUSE 15A (LEAD IN)	
	2050184000	2P CONNECTOR BASE USED 2	
RL001	2050173008	8P TERMINAL	
	2050075025	2P TERMINAL USED 2	
	2050185054	5P WIRE HOLDER USED 4	
	2140041008	RELAY USED 2	
	2050122033	3P CONNECTOR PIN ASS'Y USED 3	
	2050133051	5P NH CONNECTOR BASE USED 4	
	2050133035	3P NH CONNECTOR BASE USED 6	
	2030226027	1P CONTACT ASS'Y	
	2034197039	3P CONNECTOR CORD USED 2	
	2034189034	3P CONNECTOR CORD USED 2	
	2034179015	3P CONNECTOR CORD USED 2	
	2036110001	4P CONNECTOR CORD USED 2	
	2036110014	4P CONNECTOR CORD USED 2	
	2038109036	5P CONNECTOR CORD USED 2	
	2038117057	5P CONNECTOR CORD USED 2	
	2038117060	5P CONNECTOR USED 2	
	2034185012	3P CONNECTOR CORD USED 2	

PUS0021J POWER AMP & POWER SOURCE UNIT



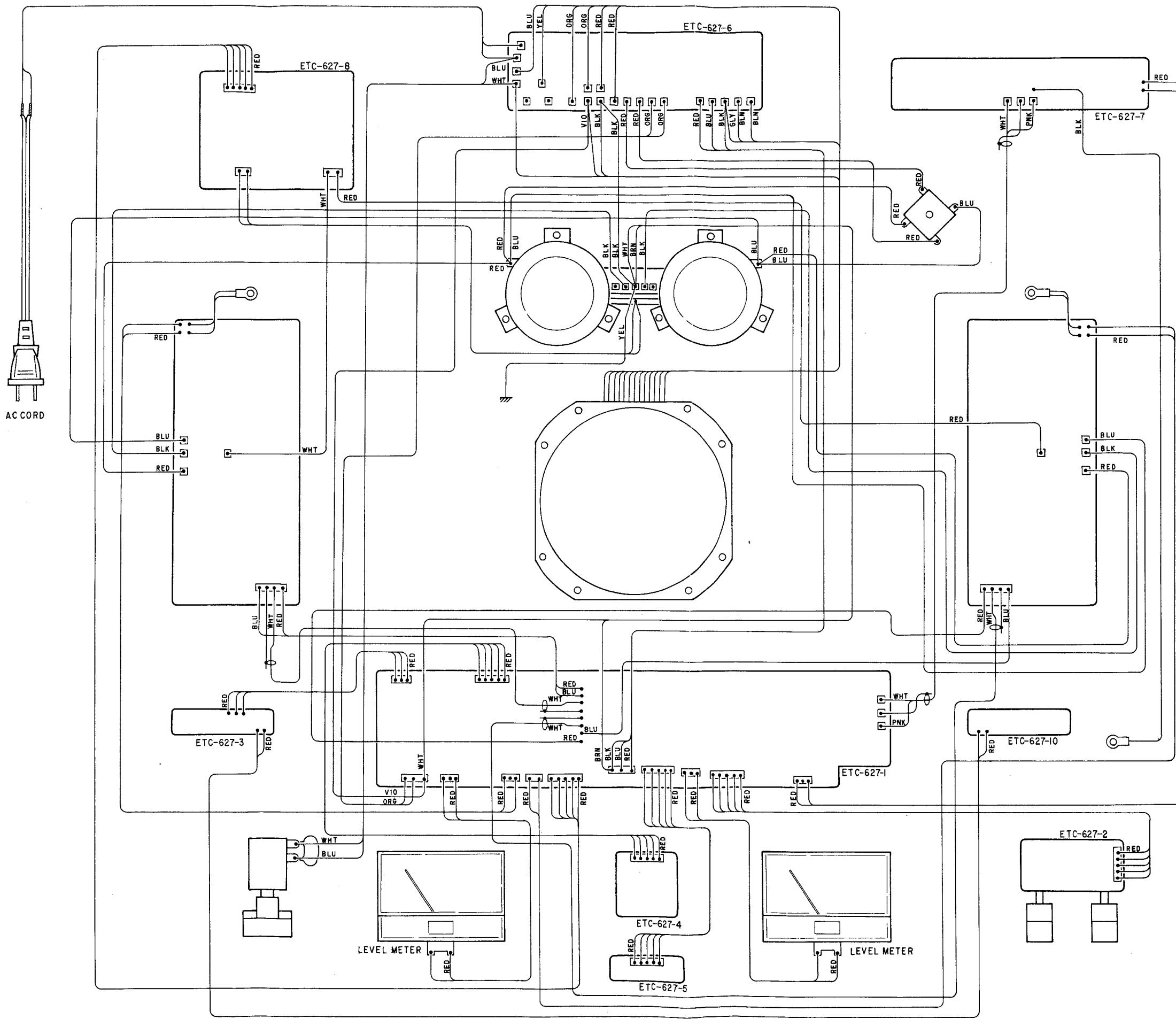
PUS0021J P.A & P.S. UNIT PARTS LIST

Ref. No.	Part No.	Part Name & Descriptions
SEMICONDUCTORS		
IC001	2630244001	NJM082D(JRC) IC
IC002	2630244001	NJM082D(JRC) IC
IC003	2630229000	LA6458DS(SANYO) IC
IC004	2630229000	LA6458DS(SANYO) IC
TR001	2730198015	2SC1815(BL) TRANSISTOR
TR002	2730198015	2SC1815(BL) TRANSISTOR
TR003	2730205005	2SC1941(L) TRANSISTOR
TR004	2730205005	2SC1941(L) TRANSISTOR
TR005	2710110000	2SA916(L) TRANSISTOR
TR006	2710110000	2SA916(L) TRANSISTOR
TR007	2730199001	2SC2238(Y) TRANSISTOR
TR008	2730199001	2SC2238(Y) TRANSISTOR
TR009	2710104003	2SA968(Y) TRANSISTOR
TR010	2710104003	2SA968(Y) TRANSISTOR
TR011	2730198002	2SC1815(Y) TRANSISTOR
TR012	2730198002	2SC1815(Y) TRANSISTOR
TR013	2710102005	2SC1015(Y) TRANSISTOR
TR014	2710102005	2SA1015(Y) TRANSISTOR
TR021	2730198002	2SC1815(Y) TRANSISTOR
TR022	2730198002	2SC1815(Y) TRANSISTOR
TR023	2710102005	2SA1015(Y) TRANSISTOR
TR024	2710102005	2SA1015(Y) TRANSISTOR
TR025	2710102005	2SA1015(Y) TRANSISTOR
TR026	2710102005	2SA1015(Y) TRANSISTOR
TR027	2730198002	2SC1815(Y) TRANSISTOR
TR028	2730198002	2SC1815(Y) TRANSISTOR
D001	2760254000	HZ7B-3 ZENER
D002	2760254000	HZ7B-3 ZENER
D003	2760254000	HZ7B-3 ZENER
D004	2760254000	HZ7B-3 ZENER
D005	2760049008	1S2076 DIODE
D006	2760049008	1S2076 DIODE
D007	2760049008	1S2076 DIODE
D008	2760049008	1S2076 DIODE
D013	2760334001	STV-1H DIODE
D014	2760334001	STV-1H DIODE
D015	2760049008	1S2076 DIODE
~022		
D023	2760350001	S1R20F DIODE
D024	2760350001	S1R20F DIODE
D027	2760216019	KB-265 DIODE
030		
D031	2760350001	S1R20F DIODE
D032	2760350001	S1R20F DIODE
D035	2760254000	HZ7B-3 ZENER
~038		
D069	2760049011	1S2076A DIODE
~0		
D045	2760337008	KB-462 DIODE
~048		
RESISTORS (not included Carbon Film ±5%, 1/4W Type)		
*VR001	2116014072	SEMI FIXED RESISTOR 10 kohm
VR002	2116014072	SEMI FIXED RESISTOR 10 kohm
VR003	2116014001	SEMI FIXED RESISTOR 100 ohm
VR004	2116014001	SEMI FIXED RESISTOR 100 ohm
*VR005	2116014069	SEMI FIXED RESISTOR 200 ohm
VR006	2116014069	SEMI FIXED RESISTOR 200 ohm
R001	2440106025	4.7 kohm ±5% 2W METAL OXIDE (NB)
R002	2440106025	4.7 kohm ±5% 2W METAL OXIDE (NB)
R003	2412369007	820 ohm ±5% 1/4W CARBON FILM (NB)
R004	2412369007	820 ohm ±5% 1/4W CARBON FILM (NB)

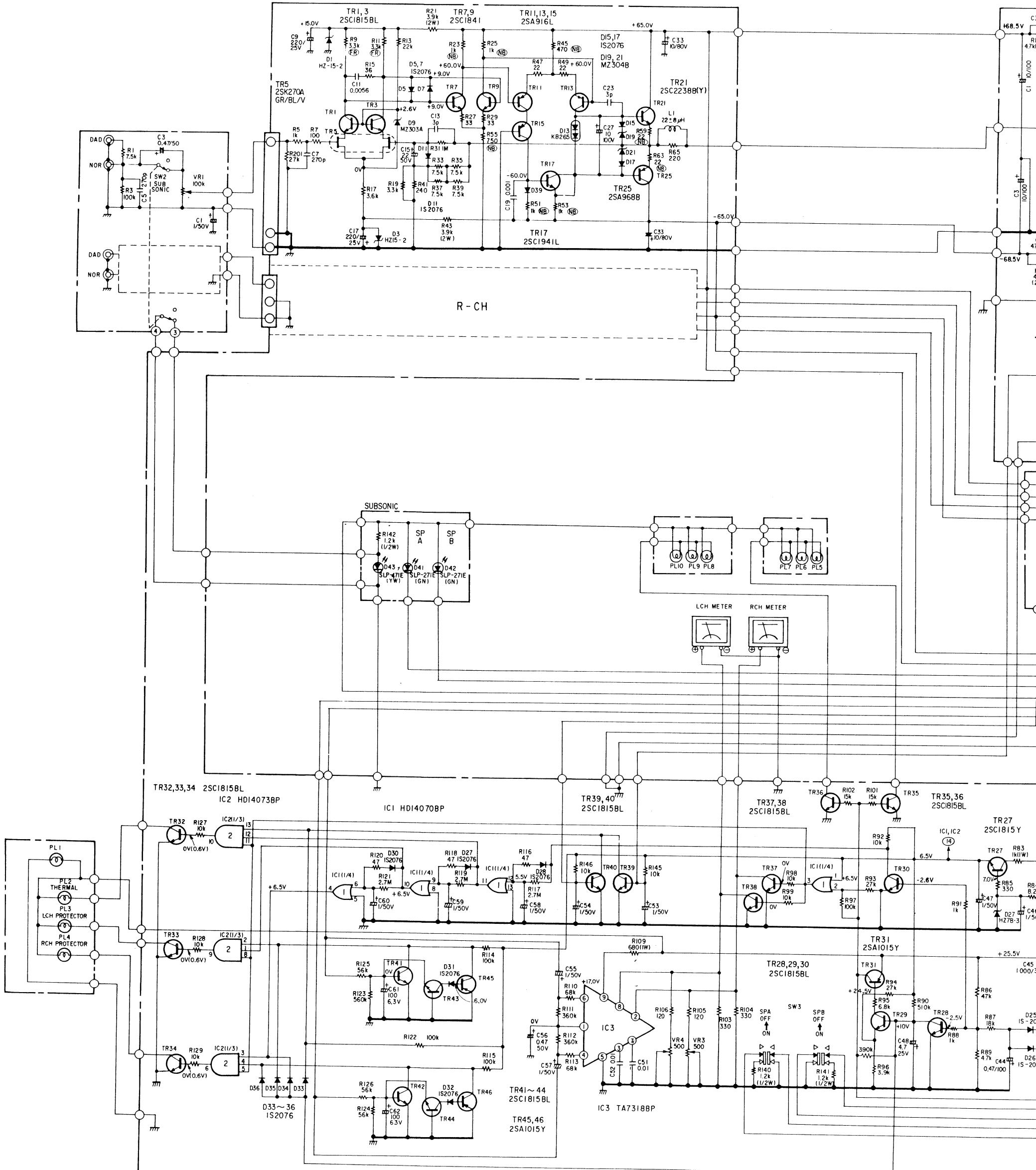
Ref. No.	Part No.	Part Name & Descriptions
RESISTORS (not included Carbon Film ±5%, 1/4W Type)		
R007	2440106025	4.7 kohm ±5% 2W METAL OXIDE (NB)
R008	2440106025	4.7 kohm ±5% 2W METAL OXIDE (NB)
R009	2412369052	2.2 kohm ±5% 1/4W CARBON FILM (NB)
~016		
R023	2412321003	1 kohm ±5% 1/4W CARBON FILM (NB)
R024	2412321003	1 kohm ±5% 1/4W CARBON FILM (NB)
R025	2412314007	100 ohm ±5% 1/4W CARBON FILM (NB)
R026	2412314007	100 ohm ±5% 1/4W CARBON FILM (NB)
R027	2412321003	1 kohm ±5% 1/4W CARBON FILM (NB)
R028	2412321003	1 kohm ±5% 1/4W CARBON FILM (NB)
R031	2440029021	100 ohm ±5% 1W METAL OXIDE (NB)
R032	2440029021	100 ohm ±5% 1W METAL OXIDE (NB)
R033	2412321003	1 kohm ±5% 1/4W CARBON FILM (NB)
R034	2412321003	1 kohm ±5% 1/4W CARBON FILM (NB)
R035	2412314007	100 ohm ±5% 1/4W CARBON FILM (NB)
R036	2412314007	100 ohm ±5% 1/4W CARBON FILM (NB)
R041	2440103028	2.7 kohm ±5% 2W METAL OXIDE (NB)
R042	2440103028	2.7 kohm ±5% 2W METAL OXIDE (NB)
R043	2412369078	4.7 kohm ±5% 1/4W CARBON FILM (NB)
R044	2412369078	4.7 kohm ±5% 1/4W CARBON FILM (NB)
R045	2412369052	2.2 kohm ±5% 1/4W CARBON FILM (NB)
R046	2412369052	2.2 kohm ±5% 1/4W CARBON FILM (NB)
R047	2412321003	1 kohm ±5% 1/4W CARBON FILM (NB)
~050		
R051	2412369052	2.2 kohm ±5% 1/4W CARBON FILM (NB)
R052	2412369052	2.2 kohm ±5% 1/4W CARBON FILM (NB)
R053	2412369078	4.7 kohm ±5% 1/4W CARBON FILM (NB)
R054	2412369078	4.7 kohm ±5% 1/4W CARBON FILM (NB)
R055	2410212004	13 kohm ±5% 1/4W CARBON FILM
R056	2410212004	13 kohm ±5% 1/4W CARBON FILM
R057	2440103028	2.7 kohm ±5% 2W METAL OXIDE (NB)
R058	2440103028	2.7 kohm ±5% 2W METAL OXIDE (NB)
R059	2410212004	13 kohm ±5% 1/4W CARBON FILM
R060	2410212004	13 kohm ±5% 1/4W CARBON FILM
R061	2412321032	4.7 ohm ±5% 1/4W CARBON FILM (NB)
~064		
R067	2412321016	22 ohm ±5% 1/4W CARBON FILM (NB)
~074		
R079	2432033038	0.18/0.18 ohm 2W WIRE WOUND
~082		
R038	2412321016	22 ohm ±5% 1/4W CARBON FILM (NB)
~090		

Ref. No.	Part No.	Part Name & Descriptions
CAPACITORS (not included Ceramic ±5%, 50V Type)		
R093	2412321032	4.7 ohm ±5% 1/4W CARBON FILM (NB)
~096		
R097	2440021029	22 ohm ±5% 1W METAL OXIDE (NB)
R098	2440021029	22 ohm ±5% 1W METAL OXIDE (NB)
R101	2760289004	PTH487A01BD222TS POSISTOR
R102	2760289004	PTH487A01BD222TS POSISTOR
R111	2412369007	820 ohm ±5% 1/4W CARBON FILM (NB)
R112	2412369007	820 ohm ±5% 1/4W CARBON FILM (NB)
CAPACITORS (not included Ceramic ±5%, 50V Type)		
C001	2544181014	10μF ±20% 100V ELECTROLYTIC
~004		
C007	2521022002	33pF ±5% 50V MICA
C008	2521022002	33pF ±5% 50V MICA
C009	2544180002	47μF ±20% 63V ELECTROLYTIC
C010	2544180002	47μF ±20% 63V ELECTROLYTIC
C011	2554137003	470pF ±5% 50V PLASTIC FILM
~016		
C017	2544181001	1μF ±20% 100V ELECTROLYTIC
C018	2544181001	1μF ±20% 100V ELECTROLYTIC
C019	2554137003	470pF ±5% 50V PLASTIC FILM
C020	2554137003	470pF ±5% 50V PLASTIC FILM
C021	2554149004	0.0015μF ±5% 50V PLASTIC FILM
C022	2554149004	0.0015μF ±5% 50V PLASTIC FILM
C023	2554084017	0.01μF ±5% 100V PLASTIC FILM
C024	2554084017	0.01μF ±5% 100V PLASTIC FILM
C025	2554149004	0.0015μF ±5% 50V PLASTIC FILM
C026	2554149004	0.0015μF ±5% 50V PLASTIC FILM
C027	2544181014	10μF ±20% 100V ELECTROLYTIC
C028	2544181014	10μF ±20% 100V ELECTROLYTIC
C029	2556115007	0.0047μF ±5% 50V PLASTIC FILM
C030	2556115007	0.0047μF ±5% 50V PLASTIC FILM
C035	2556115007	0.0047μF ±5% 50V PLASTIC FILM
C036	2556115007	0.0047μF ±5% 50V PLASTIC FILM
C037	2521079039	47pF ±10% 500V MICA
~040		
C041	2561017019	0.01μF ±10% 630V METALIZED
C042	2561017019	0.01μF ±10% 630V METALIZED
C043	2544181001	1μF ±20% 100V ELECTROLYTIC
~046		
C047	2544181014	10μF ±20% 100V ELECTROLYTIC
C048	2544181014	10μF ±20% 100V ELECTROLYTIC
C049	2561017019	0.01μF ±10% 630V METALIZED
C050	2561017019	0.01μF ±10% 630V METALIZED
C051	2544181001	1μF ±20% 100V ELECTROLYTIC
~056		
C059	2554137003	470pF ±5% 50V PLASTIC FILM
C060	2554137003	470pF ±5% 50V PLAST

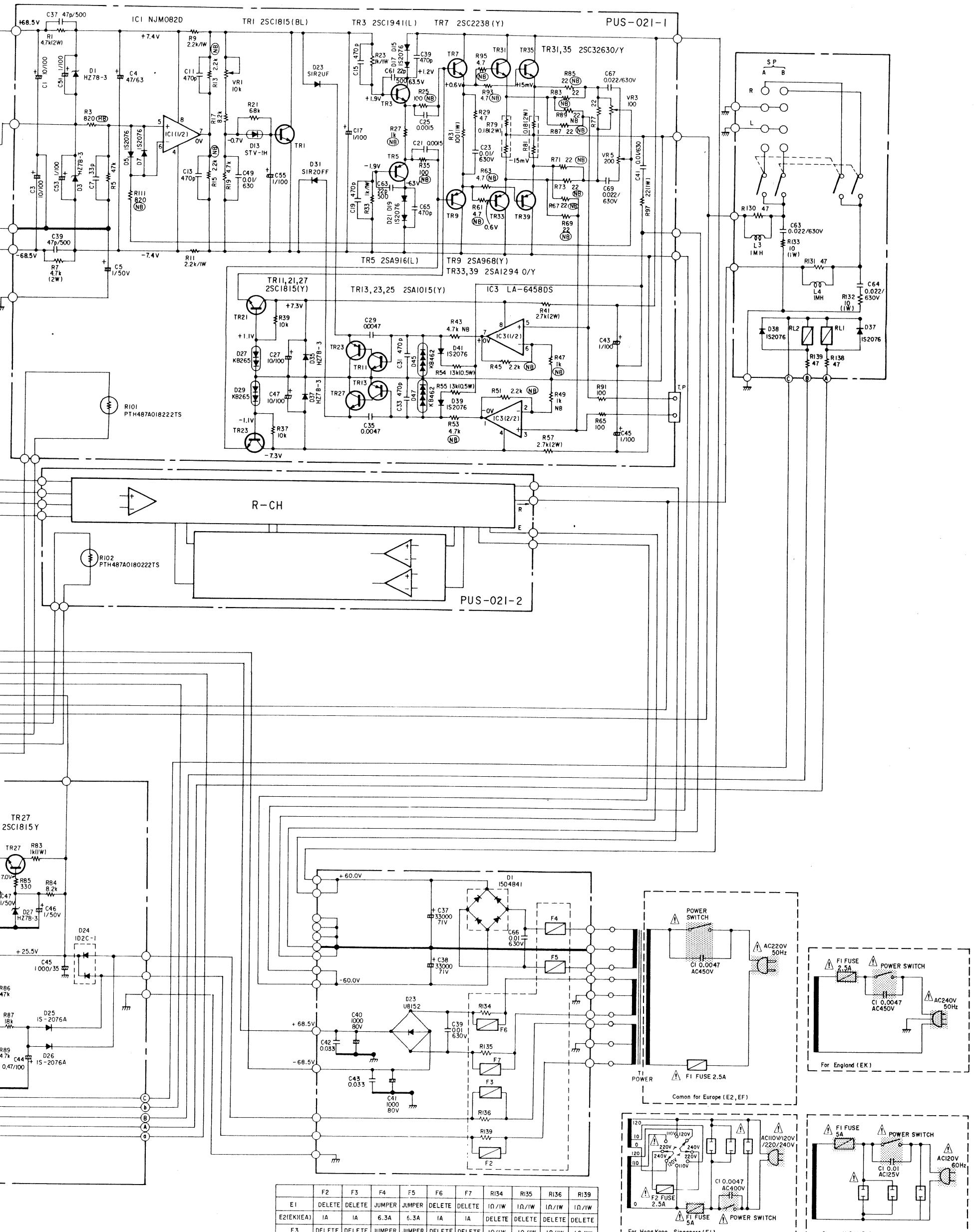
CONNECTION DIAGRAM (For E3 Model)



WIRING DIAGRAM

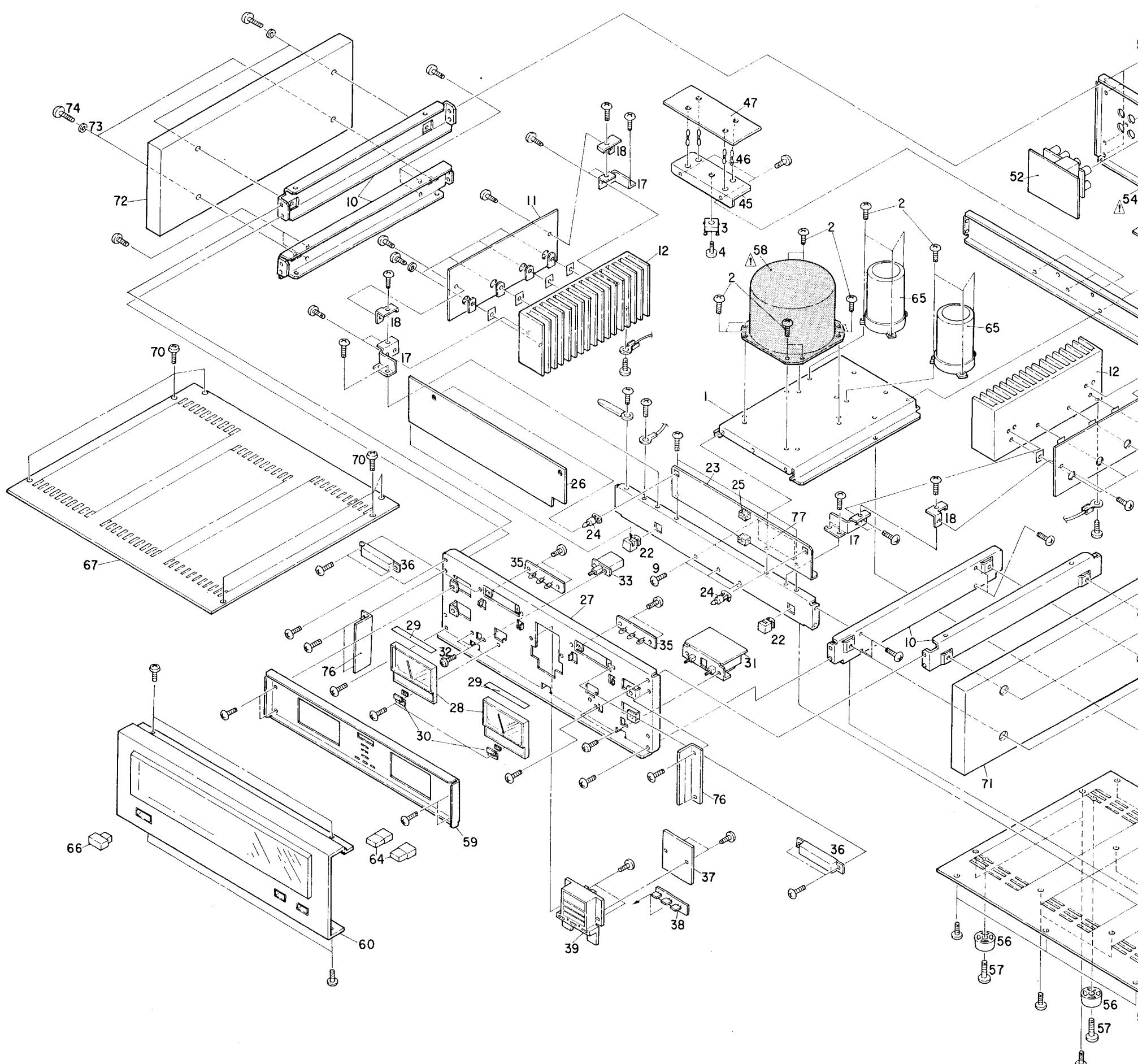


  Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.



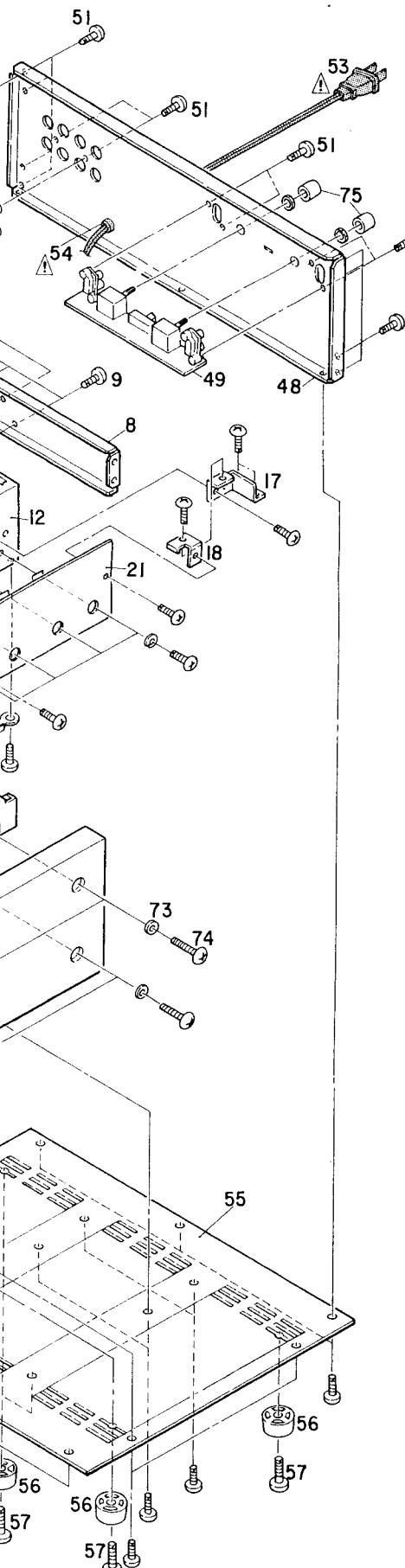
NOTES:
ALL RESISTANCE VALUES IN OHM, K = 1,000 OHM,
M = 1,000,000 OHM.
ALL CAPACITANCE VALUES IN MICROFARAD, P = MICRO-
MICRO FARAD.
EVERY VOLTAGES AND CURRENTS IS MEASURED AT
NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT
PRIOR NOTICE.

EXPLODED VIEW OF CHASSIS AND CABINET (For E3 Model)



NOTE: 1. See addendum list below for the parts with asterisk(*) on the Ref No. and the other parts not included in the list.
2. * Marked not included EXPLODED VIEW.
3. This list is prepared base on F3.

EXPLODED VIEW PARTS LIST



WARNING

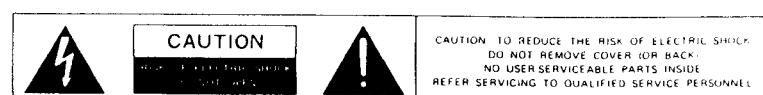
1. Component parts

Parts marked with and/or shading in this service manual have special characteristics important to safety. Be sure to use the specified parts for replacement.

2. Leakage current

Before returning the appliance to customer, test the leakage current when the power plug is connected. Use a calibrated (with an error of not more than 5%) leakage current tester and measure the leakage current from any exposed metal to the earth ground. Reverse the power plug polarity and test the above again.

Any current measured MUST NOT EXCEED 0.5 millamps. Corrective measure must be taken if it exceeds the limit.



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user of the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

**WARNING: TO PREVENT FIRE OR SHOCK HAZARD,
DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.**

CAUTION: SAVE THIS BOX AND PACKING MATERIALS FOR RESHIPMENT IF NECESSARY, WHEN RETURNING THE UNIT, PLEASE PACK UNIT AS PACKING INSTRUCTIONS TO AVOID COSTLY SHIPPING DAMAGE. FOR YOUR OWN PROTECTION PLEASE PACK CAREFULLY AS SHIPPING DAMAGES ARE NOT COVERED BY WARRANTY.

NIPPON COLUMBIA CO., LTD.

No. 14-14, 4-CHOME AKASAKA,
MINATO-KU, TOKYO 107 JAPAN
TEL: 03-584-8111
TLX: JAPANOLA J22591
CABLE: NIPPONCOLUMBIA TOKYO

Printed in Japan

Part No.	Part Name & Descriptions
4730353010	TAPPING SCREW (2) 3x6
1430245191	FILTER (47x18)
EP-4772	CORD HOLDER (USED 3)
4752003005	SPRING WASHER ϕ 3
4751003005	WASHER ϕ 3
4734454038	TAPPING SCREW (TRANS) 4x8
4450033005	WIRE CLAMP BAND (USED 15)
2034193020	3P CONNECTOR CORD
2034193003	3P CONNECTOR CORD
4770224002	SP WASHER
4610178072	RUBBER SHEET
4150164041	SPACER (12x12)
1220007073	SPACER (420x16)
5130807000	RATING SHEET (PRA)
5130675054	SERIAL NO. PLATE
4770126016	RIVET
CKING & ACCESSORIES (not included EXPLODED VIEW)	
5040055007	CABINET SHEET
5040077014	PROTECTOR SHEET
5030404008	CUSHION
5010924003	CARTON CASE
5050061007	ENVELOPE
5111145105	INST. MANUAL
5158053108	WARRANTY IN ENVELOPE
5130784000	INDICATION SHEET

ADDENDUM LIST

Ref. No.	Part Name & Descriptions	Part No.		
		E2 for Europe		E1 for Hong Kong
6	BASE UNIT	ETC0627B-9		ETC0627C-9
11	POWER (L) UNIT	PUS0021L-1		PUS0021L-1
21	POWER (R) UNIT	PUS0021L-2		PUS0021L-2
26	CONTROL UNIT	ETC0627B-1		ETC0627C-1
31	SP SW UNIT	ETC0627B-2		ETC0627C-2
▲ 33	POWER SWITCH	2124405013		2124405013
▲ 34	CAPACITOR (SPARK KILLER)	2568023006 (0.01 μ F/250V)		2568023006 (0.01 μ F/160V)
35	LAMP (3) UNIT	ETC0627B-3		ETC0627C-3
37	LAMP (4) UNIT	ETC0627B-4		ETC0627C-4
38	LED UNIT	ETC0627B-5		ETC0627C-5
48	BACK PANEL	1050567000		1050570000
49	INPUT UNIT	ETC0627B-7		ETC0627C-7
52	SP UNIT	ETC0627B-8		ETC0627C-8
▲ 53	AC CORD	2062016001		2006031026
▲ 54	CORD BUSH	4450020005		4450020005
▲ 58	POWER TRANS	2335435005		2335440003
▲ 103	VOLTAGE SEL SW			2120186006
104	PAN SCREW 3x6 (BLACK)			4711303034
105	FUSE HOLDER			2020013101
106	PAN SCREW 3x8 (BLACK)			4711304033
107	NUT M3			4756006008
108	FUSE (6.3A)			2061036011
109	FUSE LABEL (T6.3A)			5130654091
110	PRESET LABEL			5150290008